

10/20/17

"What you do today can improve all your tomorrows"-Ralph Marston

HW: "Fractional Exponents" back #38, 43, 48, 54, 59, 61, 64, 67, 71, 75, 78
Test 3 on Monday 10/30

Aim: What do Fractional Exponents tell us?

Warm Up:

Simplify: $\left(\frac{x^3}{y^2}\right)^{-1} = \left(\frac{y^2}{x^3}\right)^1 = \frac{y^2}{x^3}$

If $x \geq 0$ and n is a positive integer then:

$$(1) \quad x^{\frac{1}{n}} = \sqrt[n]{x}$$

$$(2) \quad x^{\frac{m}{n}} = (\sqrt[n]{x})^m = \sqrt[n]{x^m}$$

★ Think: $\frac{\text{Power}}{\text{Root}}$

$$(3) \quad x^{-\frac{m}{n}} = \frac{1}{(\sqrt[n]{x})^m} = \frac{1}{\sqrt[n]{x^m}}, x \neq 0$$

Examples: Write in radical form first

$$1. 256^{\frac{1}{2}} = (\sqrt[2]{256})^1 \text{ or } \sqrt[2]{256}$$

$$\sqrt{256} = 16$$

$$2. 8^{\frac{1}{3}} = \sqrt[3]{8}$$

$$= 2$$

$$3. \left(\frac{27}{64}\right)^{\frac{1}{3}} = \sqrt[3]{\frac{27}{64}}$$

$$= \frac{3}{4}$$

$$5. \frac{32^{-\frac{2}{5}}}{1} = \frac{1}{32^{\frac{2}{5}}}$$

$$= \frac{1}{\sqrt[5]{32}^2} = \frac{1}{4}$$

$$8 \text{ a. } (-27)^{\frac{1}{3}}$$

$$\sqrt[3]{-27}$$

$$\boxed{-3}$$

$$\text{b. } -27^{\frac{1}{3}}$$

$$- \sqrt[3]{27}$$

$$- 3$$

Rewrite each of the following using fractional exponents.

10. a. $5\sqrt{x} = 5x^{\frac{1}{2}}$

b. $\sqrt[3]{5x^2} =$

$$(5x^2)^{\frac{1}{3}} = \boxed{5^{\frac{1}{3}} x^{\frac{2}{3}}}$$

c. $\sqrt[3]{(5x)^2} = \boxed{(5x)^{\frac{2}{3}}}$

d. $\sqrt[5]{x^4y^3} =$

$$(x^4y^3)^{\frac{1}{5}} = \boxed{x^{\frac{4}{5}} y^{\frac{3}{5}}}$$